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PATENTS
108030-0005PCT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The International Application of:)
Hydro-Photon, Inc., et al.)
)
International Application No.:)
PCT/US03/30061)
)
International Filing Date: September 24, 2003)
)
For: UV LED BASED WATER PURIFICA-)
TION MODULE FOR INTERMITTANTLY)
OPERABLE FLOW-THROUGH HYDRA-)
TION SYSTEMS)

Application File No. 108030-0005PCT

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RESPONSE TO WRITTEN OPINION

Sirs:

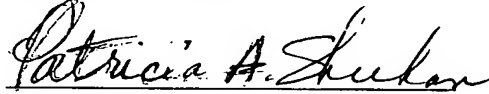
In response to the Written Opinion, we have amended independent claims 15, 32 and 38 to more particularly point out that the solid state UV devices situated in a water-flow path turn on when a signaling means (claim 15), sensor (claim 32) or a pump (claim 38) indicates that water is to flow along the path, and turn off otherwise. The UV devices, which are located either in tubing, or in the water container where the container joins the tubing, or in both places, thus operate intermittently.

In contrast, the cited LeBleu reference describes a system in which water “is continuously treated in a bacteriostat loop” (see, Abstract – emphasis added). The water “recirculates” through the bacteriostat loop, which includes “a pump, carbon block filter (31) and a (sic) ultra violet germicidal light for killing bacteria (29).” Column 10, lines 59-63. (See, also, e.g., Column 11, lines 22-24; Column 13, lines 5-7; Column 16, lines 21-23). Thus, the UV device in the LeBleu reference operates continuously and does not, as in the current system, operate intermittently.

We have also amended claim 39 to depend from claim 38, to correct a typographical error.

The amendment of claims 15, 32 and 38 should point out with more particularity the novelty and inventive step of these claims and claims 17, 19-20, 24-29 that depend from claim 15; claims 33 and 35-37 that depend from claim 32; and claims 39, 40 and 42-43 that depend from claim 38. No new matter has been added.

Respectfully submitted,



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- 1 7. The wearable hydration system of claim 4 wherein the wearable pack is made of
2 photovoltaic material and supplies power to charge one or more of the batteries, fuel
3 cells, solar cells and capacitors.

- 1 8. The wearable hydration system of claim 1 wherein the path through the
2 purification module includes a wider section to allow water to flow unimpeded past the
3 UV devices.

- 1 9. The wearable hydration system of claim 8 wherein the path provided through
2 the purification module is sized to provide UV radiation of at least 25 mJ/cm^2 to all of
3 the water flowing past the UV devices.

- 1 10. The wearable hydration system of claim 1 wherein the bladder is integral with
2 the wearable pack.

- 1 11. The wearable hydration system of claim 1 further including one or more filters
2 to remove sediments from the fluid.

- 1 12. The wearable hydration system of claim 1 further including a plurality of solid
2 state UV devices mounted in walls of the bladder.

- 1 13. The wearable hydration system of claim 12 further including a user-activated
2 switch to turn on the wall-mounted UV devices.

- 1 14. The wearable hydration system of claim 12 further including a switch that turns
2 on the wall-mounted UV devices when the power supply has sufficient power.

- 1 15. A purification module for use with a wearable or portable hydrating fluid
2 container, the water purification module including
3 tubing for providing a path for the hydrating fluid from the container;
4 means for signaling when water is to flow along the path from the container
5 through the tubing;

6 one or more solid state UV devices that are positioned in the path, either in the
7 tubing, or in the region of the container that is shaped to join the tubing, or both, the
8 UV devices providing UV radiation in a germicidal range to purify the flowing water,
9 the UV devices turning on when the means for signaling signals water flow and turning
10 off otherwise; and

11 a power supply that provides power to the purification module.

1 16. The purification module of claim 15 wherein the means for signaling is a water
2 flow sensor.

1 17. The purification module of claim 15 wherein the means for signaling is a user-
2 operated valve that the user opens to provide water flow.

1 18. The purification module of claim 17 wherein the valve is a push-pull valve
2 positioned on a top of the container and water flow is initiated by opening the valve and
3 upending the container.

1 19. The purification module of claim 15 wherein the means for signalling is a user-
2 activated switch.

1 20. The purification module of claim 15 wherein the power supply includes one or
2 more of batteries, fuel cells, capacitors, solar cells and windup or crank-type dynamos.

1 21. The purification module of claim 20 wherein the power supply includes solar
2 cells that charge one or more of the batteries, fuel cells and capacitors.

1 22. The purification module of claim 15 further including a wearable pack for/
2 carrying the container and the wearable pack is made of photovoltaic material that
3 supplies power to the UV devices.

- 1 23. The purification module of claim 22 wherein the wearable pack supplies power
2 to charge one or more batteries, fuel cells, solar cells and capacitors that are included in
3 the power supply.
- 1 24. The purification module of claim 15 wherein the path through the purification
2 module includes a wider section to allow water to flow unimpeded past the UV devices.
- 1 25. The purification module of claim 24 wherein the path provided through the
2 purification module is sized to provide UV radiation of at least $25\text{mJ}/\text{cm}^2$ to all of the
3 water flowing past the UV devices.
- 1 26. The purification module of claim 15 further including one or more filters to
2 remove sediments from the fluid.
- 1 27. The purification module of claim 15 further including a plurality of UV solid
2 state devices mounted in the walls of the container.
- 1 28. The purification module of claim 27 further including a user-activated switch to
2 turn on the wall-mounted UV devices.
- 1 29. The purification module of claim 27 further including a switch that turns on the
2 wall-mounted UV devices when the power supply has sufficient power.
- 1 30. The purification module of claim 22 wherein the container is integral with the
2 wearable pack.
- 1 31. The purification module of claim 22 wherein the container is a water bottle.
- 1 32. A purification module including
2 tubing for providing a path for the hydrating fluid the tubing including a first
3 end through which water enters the tubing and a second end through which water exits
4 the tubing;

5 a sensor positioned in the tubing for signaling when water is flowing into and
6 through the tubing;

7 one or more solid state UV devices that are positioned in the tubing and provide
8 UV radiation in a germicidal range to purify the water flowing along the path from the
9 first end to the second end, the UV devices turning on when the sensor indicates that
10 water is flowing along the path and turning off when the sensor no longer indicates that
11 water is flowing along the path; and

12 a power supply for supplying power to the UV devices.

1 33. The purification module of claim 32 wherein the power supply includes one or
2 more of batteries, fuel cells, capacitors and solar cells.

1 34. The purification module of claim 33 wherein the power supply includes solar
2 cells that charge one or more of the batteries, fuel cells and capacitors.

3 35. The purification module of claim 32 wherein the path through the purification
4 module includes a wider section to allow water to flow unimpeded past the UV devices.

1 36. The purification module of claim 35 wherein the path provided through the
2 purification module is sized to provide UV radiation of at least 25 mJ/cm² to all of the
3 water flowing past the UV devices.

1 37. The purification module of claim 32 further including one or more filters to
2 remove sediments from the fluid.

38. A water filtration system including:

1 one or more filters positioned for removing sediment from the water;

2 tubing for providing a path for flowing water;

3 a pump for introducing water to the tubing;

4 a purification module including one or more solid state UV devices that are
5 positioned in the tubing and provide UV radiation in a germicidal range to purify the

6 water flowing along the path, the UV devices operating intermittently to turn on when
7 the pump introduces water to the path and turn off when water flow ceases along the
8 path; and
9 a power supply for providing DC power to the UV devices.

10 39. The water filtration system of claim 39 wherein the power supply converts
11 energy associated with the pumping action of the pump to DC power for use by the UV
12 devices.

1 40. The water filtration system of claim 38 wherein the power supply includes one
2 or more of batteries, fuel cells, capacitors, solar cells and windup or crank-type
3 dynamos.

1 41. The water filtration system of claim 40 wherein the power supply includes solar
2 cells that charge one or more of the batteries, fuel cells and capacitors.

1 42. The water filtration system of claim 38 wherein the path through the
2 purification module includes a wider section to allow water to flow unimpeded past the
3 UV devices.

1 43. The water filtration system of claim 42 wherein the path provided through the
2 purification module is sized to provide UV radiation of at least 25 mJ/cm^2 to all of the
3 water flowing past the UV devices.